

**Ontario Species at Risk Evaluation Report for
Common Five-lined Skink
Scinque pentaligne commun
(*Plestiodon fasciatus*)**

Great Lakes/St. Lawrence Population

Committee on the Status of Species at Risk in Ontario
(COSSARO)

(Great Lakes/St. Lawrence Population)
Assessed by COSSARO as Special Concern

September 2021

Scinque pentaligne commun (population des Grands Lacs et du fleuve Saint-Laurent)

Le scinque pentaligne commun (population des Grands Lacs et du fleuve Saint-Laurent) est classée dans la catégorie des espèces préoccupantes en Ontario par le CDSEPO.

La population de scinques pentalignes communs des Grands Lacs et du fleuve Saint-Laurent est classée dans la catégorie des espèces préoccupantes par le CDSEPO. Les déclinés sont présumés, mais l'évaluation est limitée à cause de l'insuffisance des relevés. Un éventail de menaces, comme la prédation, la mortalité due à la circulation routière et la perte d'habitat, persistent en s'aggravant et on estime que cette espèce deviendra vraisemblablement menacée si ces facteurs ne sont pas inversés. Ce statut est conforme au statut actuellement attribué à l'espèce par le COSEPAC.

Cette publication hautement spécialisée n'est disponible qu'en anglais conformément au Règlement 671/92, selon lequel il n'est pas obligatoire de la traduire en vertu de la Loi sur les services en français. Pour obtenir des renseignements en français, veuillez communiquer avec le ministère l'Environnement, de la Protection de la nature et des Parcs au cossarosecretariat@ontario.ca

Executive summary

Common Five-lined Skink is the most widely distributed lizard in eastern North America. The Great Lakes/St. Lawrence Designatable Unit is one of two units in Ontario and Canada; the two units are isolated physically, genetically, and ecologically. The Common Five-lined Skink is globally secure, but vulnerable in the northern extents of its range, and the Great Lakes/St. Lawrence Designatable Unit does not have a broader biologically relevant geographic range beyond the extend of the Designatable Unit. The population is believed to have declined in recent years, although limited data are available to support this. Habitat fragmentation and road mortality are the key factors in this suspected decline.

The Great Lakes / St. Lawrence population of Five-lined skiing is classified as Special Concern by COSSARO. Declines are suspected, but assessment is limited by lack of survey effort. A range of threats, including predation, road mortality, and habitat loss are persistent and increasing, and the species is considered likely to become threatened if these factors are not reversed. This status is consistent with the current COSEWIC status.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Formerly included in the genus *Eumeces*, the Common Five-lined Skink (*Plestiodon fasciatus*) is one of three *Plestiodon* species in North America. Despite an extensive global range, no subspecies are recognized, although there is substantial phylogenetic structure and suspected cryptic species in the eastern USA portion of the range (Crother *et al.* 2017).

1.1.2. Designatable units

COSEWIC recognizes two designatable units in Ontario: the Carolinian population, and Great Lakes/St. Lawrence population. This is based on genetic deafferentation between populations, the physical separation between them and biogeographic distinction: the populations are discrete, and differences are evolutionarily significant (COSEWIC 2021).

1.1.3. Native status

Common Five-lined Skink is native to Ontario (COSEWIC 2021).

1.1.4. Occurrence

Common Five-lined Skink occurs in Ontario, and populations spend their entire life cycles within the province (COSEWIC 2021).

1.2. Eligibility results

Common Five-line Skink (*Plestiodon fasciatus*), Great Lakes/St. Lawrence population, is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G5T3 (NatureServe 2021)
- IUCN: Least Concern (2007)
- NRANK Canada: N3
- COSEWIC: Special Concern (April 2021)
- SARA: Special Concern (Schedule 1)
- ESA 2007: Special Concern (month and year of last assessment)
- SRANK: S3 (ranked in 2015)

2.2. Distribution in Ontario

The Great Lakes/St. Lawrence population of Common Five-lined Skink follows the southern margin of the Canadian Shield, from Georgian Bay to Leeds and Grenville counties. Out of 118 historic EOs, 87 are currently considered extant; however, search effort has been patchy and did not specially target historic sites (COSEWIC 2021). The lack of search effort means that the species' absence at historic EOs without recent observations cannot be assumed. The EAO and IAO for the population are 38,042 km² and 2,784 km² respectively for recent observations since 1998, and 39,043 km² and 5,328 km² respectively if historic records are included (COSEWIC 2021). The lack of survey effort at many historic sites means that the latter figures for all records may be more appropriate, although comparing recent to historic records does suggest a decline of 20.8% in EAO and 50.3% in IAO (COSEWIC 2021).

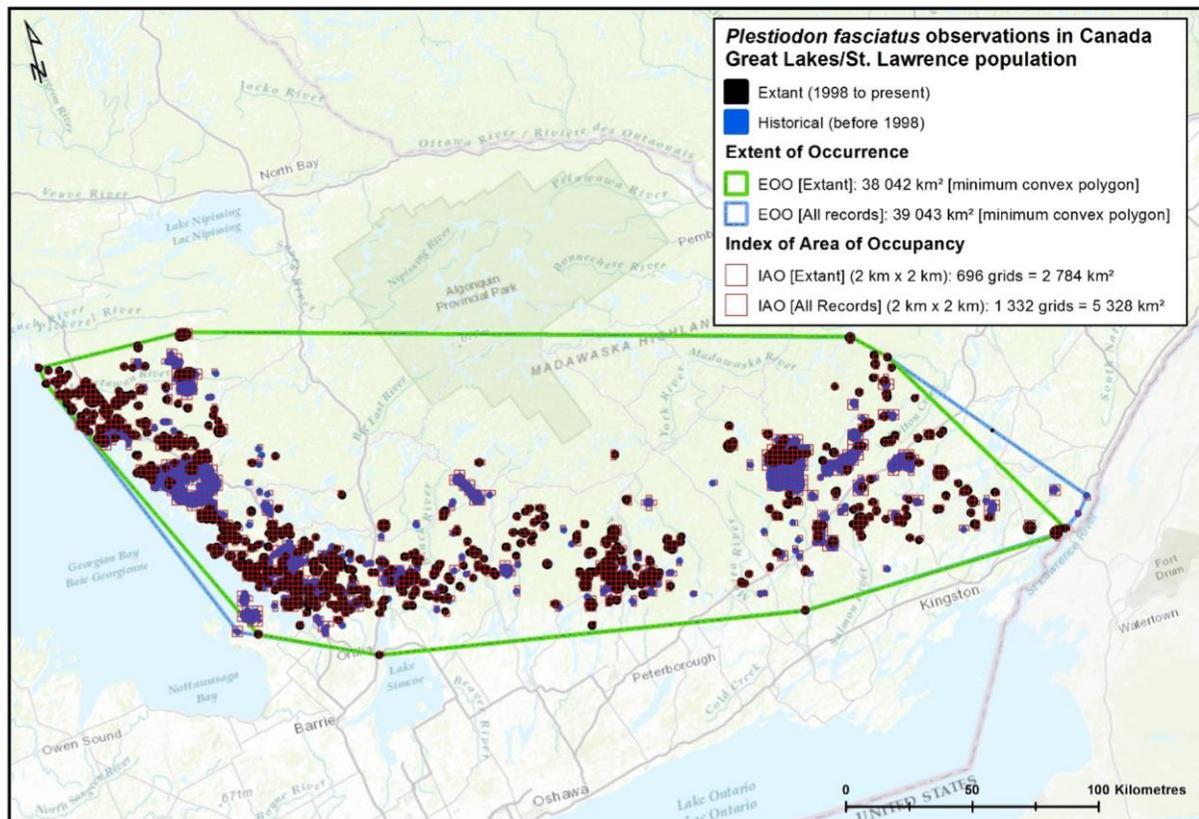


Figure 1. Historic and current distribution, EOO, and IAO for the Great Lakes/St. Lawrence population of Common Five-lined Skink (COSEWIC 2021).

2.3. Distribution, status and the broader biologically relevant geographic range outside Ontario

Common Five-lined Skink is the most widely distributed lizard in eastern North America (Powell *et al.* 2016). Their range extends approximately 1,900 km from the Atlantic seaboard to Texas and Minnesota and 1,800 km from southern Ontario to the Gulf of Mexico (Fitch 1954; Powell *et al.* 2016). The geographic range roughly follows the Temperate Deciduous Forest biome of eastern North America (Fitch 1954; Lomolino *et al.* 2017).

The Great Lakes/St. Lawrence population of Common Five-lined Skink does not have a broader biologically relevant geographic range beyond the Designatable Unit. This population became isolated from populations in the northern USA approximately 4,000 years ago by a water barrier (Strahler 1971). This isolation has led to considerable genetic differentiation both between the two Canadian populations, and between them and other populations of the species (Howes *et al.* 2006; Howes and Lougheed 2008). These two populations may have entered Canada via different post-glacial dispersal routes, and their isolation from one another has been enhanced by habitat fragmentation over the past 4,000 years, and the two populations are now separated by approximately 225 km (COSWIC 2021). In addition to the genetic and geographic

distinctness of the Great Lakes/St. Lawrence population, it occurs in a different COSWIC terrestrial Amphibians and Reptiles Faunal Province. The differing climate and physiography have likely resulted in local adaptations in the population (COSEWIC 2021).

Table 1. Condition of the Species in Adjacent Jurisdictions and Broader Biologically Relevant Geographic Range

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Condition	Notes & Sources
Quebec	n/a		
Manitoba	n/a		
Michigan	S3	Three of four neighboring populations are vulnerable (COSEWIC 2021)	(Natureserve 2021)
Minnesota	S3		(Natureserve 2021)
Nunavut	n/a		
New York	S3		(Natureserve 2021)
Ohio	SNR		(Natureserve 2021)
Pennsylvania	S4		(Natureserve 2021)
Wisconsin	S3		(Natureserve 2021)
<i>Other Relevant Jurisdiction</i>	n/a		

2.4. Ontario conservation responsibility

Approximately 2% of the global distribution of Common Five-lined Skink occurs in Ontario.

2.5. Direct threats

Common Five-lined Skink in Canada are primarily limited by habitat fragmentation (COSEWIC 2021). Historically the result of physical barriers and habitat loss from long-term climate change, habitat fragmentation is now increasing due to human actions. The species' poor dispersal abilities limit the recovery of subpopulations after disturbances. Following application of the IUCN Threats Calculator for the Great Lakes/St. Lawrence population, an overall threat impact of "medium" was determined (COSEWIC 2021), with the following specific threats:

Invasive and other problematic species (low): predation risks to skinks have increased due to human actions altering predator-prey dynamics in the region. However, this threat is lower compared to the Carolinian population due to a greater area of remaining

natural habitat. Raccoon populations on some islands in the St. Lawrence Islands National Park are seven times higher than average (Gonzales 2008), and raccoons accounted for a large proportion of skink predation studies in the Carolinian region (Hecnar and Hecnar 2005, 2013).

Residential and commercial development (low): urban expansion, in the form of cottages and small towns, is gradually increasing within the Great Lakes/St. Lawrence population as tourism increases and can negatively impact skinks (COSEWIC 2021).

Human intrusions and disturbances (low): recreational activities across the range of the Great Lakes/St. Lawrence population have increased in recent years, with associated disturbance to skinks of rocks being moved and off-road vehicle use (COSEWIC 2021).

Transportation and service corridors (low): the high density of roads and traffic in Southern Ontario has resulted in increased mortality of skinks crossing or basking on roads. In the Great Lakes/St. Lawrence population, skinks are exposed to moderately high road density and traffic flow, creating increased risks of road mortality (Feltham 2020) and isolation between subpopulations (COSEWIC 2021).

Climate change and severe weather (low): threats to skinks in the Great Lakes/St. Lawrence population are increasing frequency of droughts and summer temperatures, which may reduce nesting success through desiccation of eggs (COSEWIC 2021).

2.6. Specialized life history or habitat use characteristics

Typical predators of Common Five-lined Skink include Raccoons, crows, hawks, foxes, minks, weasels, skunks, opossums, armadillos, snakes, moles, shrews, fish, spiders, and alligators (COSEWIC 2021). Skinks can autolyse (shed) their tails as a defense mechanism, at the cost of impaired locomotion, reduced social status and reduced growth or reproduction (Goodman 2006).

3. Ontario status assessment

3.1. Application of endangered/threatened status in Ontario

3.1.1. Criterion A – Decline in total number of mature individuals

Does not apply.

Although contemporary records imply a decline in comparison to historic observations, the lack of targeted survey effort means these values are unreliable.

3.1.2. Criterion B – Small distribution range and decline or fluctuation

Does not apply.

EOO of 38,042–39,043 km² and IAO of 2,784–5,328 km² exceed thresholds.

3.1.3. Criterion C – Small and declining number of mature individuals

Does not apply.

Estimated population of > 500,000 exceeds thresholds.

3.1.4. Criterion D – Very small or restricted total population

Does not apply.

Estimated population of > 500,000 exceeds thresholds.

3.1.5. Criterion E – Quantitative analysis

Does not apply.

No analysis has been conducted.

3.2. Application of Special Concern in Ontario

Applies.

A decline is suspected in the Great Lakes/St. Lawrence population of Common Five-lined Skinks, but the lack of systematic surveys of historic EOs confounds the ability to quantify any change. However, threats from predation by native and domestic animals, mortality on roads, habitat loss from development and disturbance from recreation are all increasing. Special Concern is an appropriate designation, reflecting the potential for the species to become threatened if threats continue.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Modification not applied: the species is not globally at risk, and Ontario's conservation responsibility is clearly below 25%.

3.3.2. Status modification based on rescue effect or level of risk in broader biologically relevant geographic range

Rescue effect modification not applied: immigration is not known or possible due to physical isolation, nearby populations are also vulnerable, and conditions are deteriorating in Ontario and nearby populations.

BBRGR modification not applied: the genetic, geographic, and evolutionary isolation of the Great Lakes/St. Lawrence population does not warrant an BBRGR beyond the range of the population itself, so there is no opportunity for modification.

3.4. Other status categories

3.4.1. Data deficient

Does not apply.

3.4.2. Extinct or extirpated

Does not apply: the species has been located by recent surveys and multiple subpopulations are extant.

3.4.3. Not at risk

Does not apply.

4. Summary of Ontario status

Five-lined Skink (*Plestiodon fasciatus*), Great Lakes/St. Lawrence DU, is classified as Special Concern in Ontario based on the presence of known and continuing threats and the expected likelihood that the species could become threatened in future.

This status of this species is consistent with the definition of Special Concern under the Endangered Species Act, 2007.

5. Information sources

COSEWIC. 2021. IN PRESS. COSEWIC assessment and status report on the Common Five-lined Skink *Plestiodon fasciatus*, Carolinian population and Great Lakes/St. Lawrence population in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xvi + 61 pp. (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>).

Crother, B.I. *et al.* 2017. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in Our Understanding. 8th edition. Committee on Standard English and Scientific Names. Society for the Study of Amphibians and Reptiles Herpetological Circular No. 43. 104 pp. Website: <https://ssarherps.org/wp-content/uploads/2017/10/8th-Ed-2017-Scientific-and-Standard-English-Names.pdf>.

Fitch, H.S. 1954. Life history and ecology of the five-lined skink, *Eumeces fasciatus*. University of Kansas Publications, Museum of Natural History 8:1-156.

Goodman, R.M. 2006. Effects of tail loss on growth and sprint speed of juvenile (*Eumeces fasciatus* (Scincidae)). *Journal of Herpetology* 40:99-102.

Hecnar, S.J., and D.R. Hecnar. 2005. Feasibility of repatriation of extirpated herpetofauna to Point Pelee National Park. Final report of Memorandum of Understanding CR02-51. 268 pp.

Hecnar, S.J., and D.R. Hecnar. 2013. Five-lined skink research at Point Pelee National Park 2003. Report of contract 45318615 to Parks Canada. 105 pp.

Howes, B.J., and S.C. Loughheed. 2008. Genetic diversity across the range of a temperate lizard. *Biogeography* 35:1269-1278.

Howes, B.J., B. Lindsay, and S.C. Loughheed. 2006. Range-wide phylogeography of a temperate lizard, the five-lined skink (*Eumeces fasciatus*). *Molecular Phylogenetics and Evolution* 40:183-194.

Lomolino, M.V., B.R. Riddle, and R.J. Whittaker. 2017. *Biogeography: Biological Diversity Across Space and Time*, Fifth Edition. Sinauer Associates, Sunderland, Massachusetts. xv + 759 pp.

Powell, R., R. Conant, and J.T. Collins. 2016. *Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America*, 4th Edition. Houghton Mifflin Harcourt, Boston, Massachusetts. xiv + 494 pp.

Strahler, A.N. 1971. *The Earth Sciences*. Harper and Row, New York. 824 pp.

Feltham, J.V. 2020. Environmental structure, morphology and spatial ecology of the Five-Lined Skink (*Plestiodon fasciatus*) at high latitude range limits. Ph.D. dissertation, Trent University, Peterborough, Ontario. 181 pp.

¹ A change in the classification of a species during reassessment by COSSARO may be for genuine or non-genuine reasons. Genuine reasons may include a reduction in threats to a species such that status of the species has improved, or the continuation of threats to the species such that the status of the species has further deteriorated. Non-genuine reasons may include new information on population size or threats that was not available during a previous assessment, the use of previous COSSARO criteria that may have yielded a different result or, taxonomic revisions that result in changes in range, population sizes or designatable units.

Appendix 1: Technical summary for Ontario

Species: Common Five-lined Skink (*Plestiodon fasciatus*), Great Lakes/St. Lawrence
DU

Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	3 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Yes based on inferred and projected slow decline from ongoing threats.
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Unknown, 31 of 118 Eos are classified as historical or extirpated based on habitat loss or lack of observations – however search effort has been insufficient to confirm
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	3–30% reduction projected based on threats calculator results
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future.	Unknown
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	a. Possibly b. Yes c. No
Are there extreme fluctuations in number of mature individuals?	Unknown

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EOO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	38,042–39,043 km ² (extant sites 1998–2018, min, and all records, max, COSEWIC 2021)

Extent and occupancy attributes	Value
<p>Index of area of occupancy (IAO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i></p>	<p>2,784–5,328 km² (extant sites 1998–2018, min, and all records, max, COSEWIC 2021)</p>
<p>Is the total population severely fragmented? i.e., is >50% of its total area of occupancy in habitat patches that are: (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?</p>	<p>a. Unknown but unlikely, not enough information is available to assess viability of subpopulations in most habitat patches b. No, mean distances between subpopulations are 10 km, with relatively little habitat loss and fragmentation in the region</p>
<p>Number of locations. <i>See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term “location”. Use plausible range to reflect uncertainty if appropriate.</i></p>	<p>Likely > 80 (based on subpopulations, each of which faces different threat combinations)</p>
<p>Number of NHIC Element Occurrences <i>Request data from MNRF.</i></p>	<p>n/a</p>
<p>Is there an observed, inferred, or projected continuing decline in extent of occurrence?</p>	<p>Unknown, but possible decline: trend analysis is difficult due to lack of target surveys of historical sites</p>
<p>Is there an observed, inferred, or projected continuing decline in index of area of occupancy?</p>	<p>Unknown, but possible decline: trend analysis is difficult due to lack of target surveys of historical sites</p>
<p>Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?</p>	<p>Unknown: trend analysis is difficult due to lack of target surveys of historical sites</p>
<p>Is there an observed, inferred, or projected continuing decline in number of locations?</p>	<p>Unknown, trend analysis is difficult due to lack of target surveys of historical sites and newly discovered sites due to increasing human visitation</p>

Extent and occupancy attributes	Value
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Yes, inferred and projected decline in area and quality due to increasing threats and long-term vegetation succession
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of mature individuals in each sub-population or total population (if known)

The total population is estimated as > 500,000. This figure is extrapolated from average adult density for intensively studies localities to the area of all extant EOs.

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

A threats calculator (completed 20 June 2019) found an overall threat impact of “medium”, with threats in the following categories (individual categories are all “low”):

Invasive or other problematic species and genes
 Residential and commercial development
 Human intrusions or disturbance
 Transportation and service corridors
 Climate change and severe weather

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	No
Status of outside population(s) most likely to provide immigrants to Ontario	Vulnerable (S3) in MN, MI, NY, Not Ranked (NR) in OH, Apparently Secure (S4) in PA
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	No

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	No
Would immigrants be adapted to survive in Ontario?	Possibly
Is there sufficient suitable habitat for immigrants in Ontario?	No
Are conditions deteriorating in Ontario?	Yes
Is the species of conservation concern in bordering jurisdictions?	Yes (Vulnerable, S3, in MI and NY)
Is the Ontario population considered to be a sink?	No
Is rescue from outside populations likely?	No

Sensitive species

This is not a data sensitive species in Ontario.

Acronyms

COSEWIC: Committee on the Status of Endangered Wildlife in Canada
COSSARO: Committee on the Status of Species at Risk in Ontario
ESA: Endangered Species Act
EO: Element occurrence (as defined by NHIC)
EOO: extent of occurrence
GRANK: global conservation status assessments
IAO: index of area of occupancy
IUCN: International Union for Conservation of Nature and Natural Resources
MNRF: Ministry of Natural Resources and Forestry
NHIC: Natural Heritage Information Centre
NNR: Unranked
NRANK: National conservation status assessment
SARA: Species at Risk Act
SNR: unranked
SRANK: subnational conservation status assessment
S1: Critically Imperiled
S2: Imperiled
S3: Vulnerable
S4: Apparently Secure
S5: Secure
IUCN: International Union for Conservation of Nature and Natural Resources
CDSEPO: Le Comité de détermination du statut des espèces en péril en Ontario